CITY OF WINTERS

SEWER SYSTEM MASTER PLAN

Prepared by:

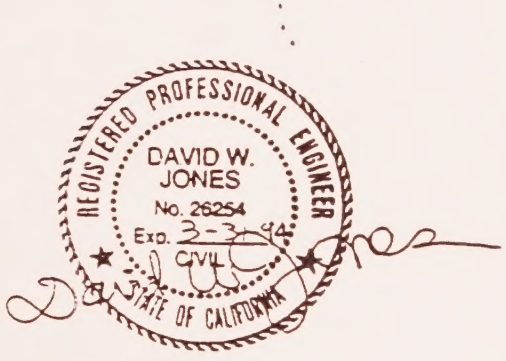
CH2M Hill

Adopted
May 19, 1992

Sewer System Master Plan

Prepared for

City of Winters, California



This Document Has Been Prepared Under the Direction of a Registered Professional Engineer

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May 8, 1992

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Introduction

The City of Winters, located in Yolo County about 30 miles west of Sacramento, California, lies on the western edge of the Sacramento River Valley against the eastern edge of the Coast Range Mountains. Winters' population in 1990 was 4,693. The projected population in the year 2010 is about 12,500. Growth is primarily planned for the area between Putah and Dry Creeks to the south and west, Interstate 505 to the east, and north to the extension of County Road 32A. This is the area within the Winters Urban Limit Line.

The Sewer System Master Plan includes the following information:

- Estimates of future waste loads
- Determination of existing wastewater treatment plant capacity
- Evaluation of future treatment and disposal facilities
- Preliminary future collection system
- Budget-level cost estimates

This report is based on the City of Winters General Plan, adopted in May 1992.

System piping for the Sewer System Master Plan may be altered slightly with changes in road layout, actual development, and any significant land use alterations. Therefore, pipe sizing and costs presented in the master plan are subject to revision during project design.

Recommendations

The recommendations of this study for the existing and future systems follow.

Existing System

The existing collection system should be repaired and maintained as recommended in past maintenance reports. In addition, the existing 8-inch-diameter pipeline in Grant Avenue should be replaced with a new 8-inch-diameter pipe between Hemenway Street and Railroad Avenue. The 8-inch-diameter pipeline located behind the homes along Taylor Street should be connected to a new 8-inch-diameter pipe within the Taylor Street right-of-way.

The East Street pump station should be improved by replacement of the level controls. System reliability has been improved with the installation of a standby generator and a new alarm system. General cleanup and removal of unused equipment would improve the aesthetics of the station.

The existing wastewater treatment system consists of a series of ponds and a 140-acre reuse site for irrigated pasture. The existing system is approaching its capacity to hold treated wastewater during the winter months when irrigation of the reuse site is not possible. Additional storage capacity is required to accommodate city growth until a new wastewater facility can be constructed. A new 40-acre-foot storage pond is proposed for this purpose. Storage Pond 3 is restricted to operating at no more than half capacity. Details of a new pond and alternative improvements for Pond 3 are the subject of a separate report. A monitoring well has been installed to determine the impacts of Pond 3 to the drainage area south of the pond. The monitoring program is necessary in order to determine the appropriate operation of Pond 3.

Additional improvements are recommended to improve reliability. Erosion control measures should be taken on all pond banks that are showing signs of undercutting as a result of wave action. The reuse area should be replanted with a permanent grass stand. The irrigation system should be improved by restoring the automatic valves.

Future System

The recommended improvements include an expanded collection system, a new pump station near Railroad Avenue and a new wastewater treatment facility.

It is recommended that the treatment plant be relocated to a new site east of County Road 89. The new plant should be constructed in two phases. Phase 1 would provide a treatment capacity of 1.0 million gallons per day (mgd) for a population of about

8,300; Phase 2 would provide a capacity of 1.5 mgd for a population of about 12,500. The proposed treatment plant would consist of an activated sludge process with effluent filtration. Treated effluent would be reused for crop or golf course irrigation during the summer months and discharged to Putah Creek or used on future wetlands during the winter months.

Table 1 summarizes estimated costs for the recommended wastewater collection and treatment improvements.

Table 1
Cost Summary

Item	Estimate
Existing System Improvements	$ 1,240,000
Collection System	5,810,000
Wastewater Treatment	10,000,000
Pump Stations and Piping	2,200,000
Land Purchase for Plant Site	400,000
Total	**$19,650,000**

Note: Costs are order-of-magnitude estimates based on March 1992 prices.

Planning Criteria

This study was conducted for the area within the Urban Limit Line (Figure 1) depicted in the Winters General Plan, adopted in May 1992.

Population

Winters' population in 1990 was 4,693. The projected population by the year 2010 is about 12,500. A straight line projection method was used to determine the population in any one of the 20 years between 1990 and 2010. A straight line projection assumes that the proposed development takes place at a steady rate throughout the 20 years. Estimates of future population are shown in Table 2.

Table 2
Population Estimates

Year	Estimated Population
1990	4,693
1995	6,600
2000	8,600
2005	10,500
2010	12,500

Treatment Plant Flow Projections

Wastewater flow estimates for a treatment plant are typically determined using unit flow rates for each land use classification or for each person in the community. The rate used varies for different communities due to the density of homes, the type of industry present, and the amount of infiltration/inflow. Infiltration/inflow is groundwater or surface water entering the sewer through joints, cracks, manholes, or unauthorized connections such as roof drains.

Flow records from June 1989 to January 1992 were reviewed. The data between June 1989 and November 1990 were determined to be incomplete or inaccurate. Flow was not recorded during October and November 1989 when the flow meter was out of service; data from the remaining 16 months are inaccurate because the meter could not be properly calibrated. A new flow meter was installed in December 1990. Data from the new flow meter have been collected from January 1991 to the present. Flow measurements from June 1989 through May 1990 show an average of 588,000 gallons of wastewater per day, or an average of 130 gallons per person. Flow measurements

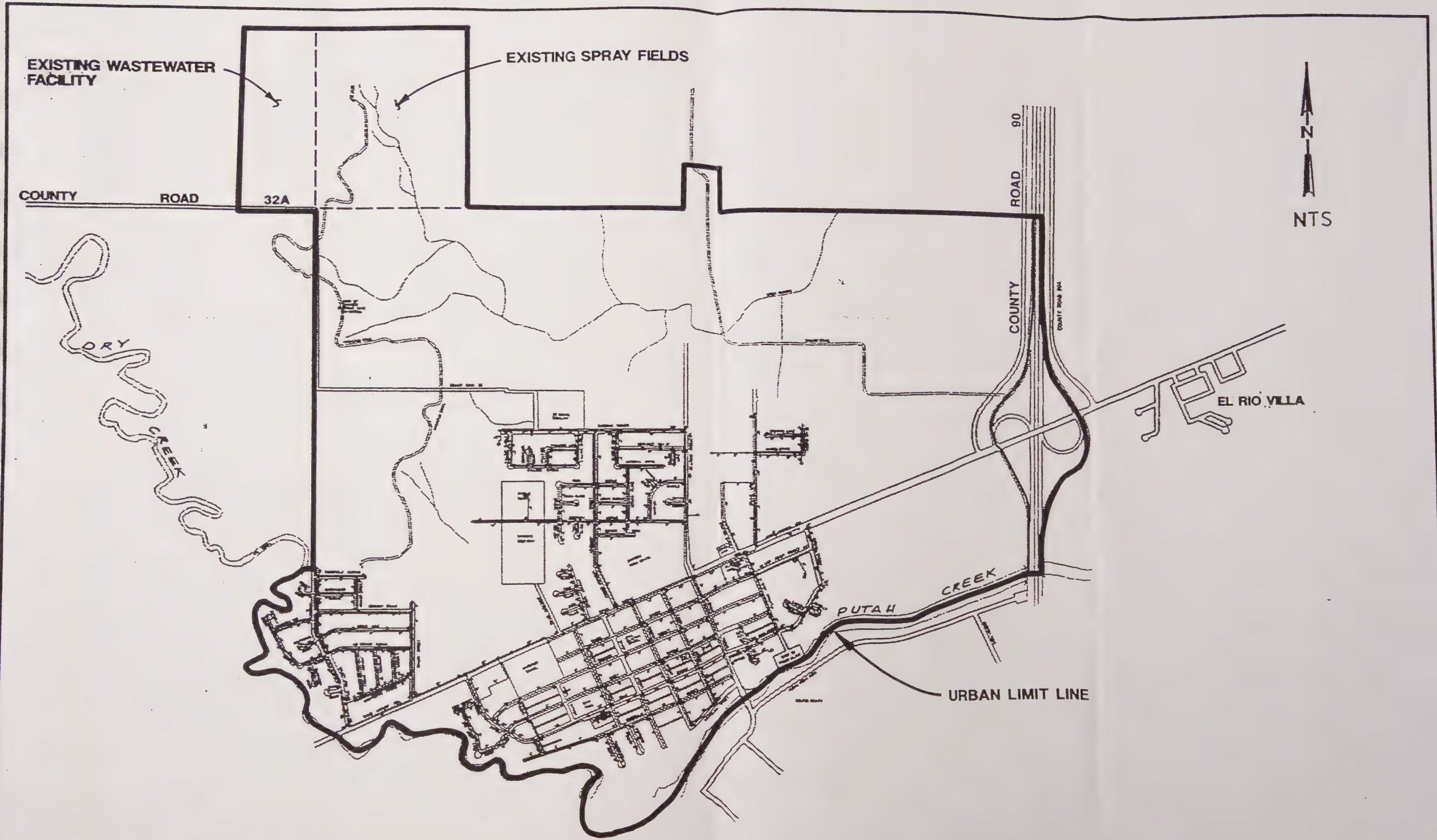

FIGURE 1
URBAN LIMIT LINE
CITY OF WINTERS

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from January 1991 through January 1992 show an average flow of 550,000 gallons of wastewater per day, or an average of about 118 gallons per person per day. Based on the recent flow records and a review of flow rates used by Davis, Fairfield, and Sacramento. A unit flow rate of 120 gallons per capita day (gpcd) was used. One hundred gpcd was allocated to residential and commercial areas, and 20 gpcd was allocated for industrial uses. This allocation does not include any wet industry. If wet industry is developed, the number of dwelling units that can be built will be reduced. Table 3 shows projected flow rates using the population data from Table 2 and a unit flow of 120 gpcd.

Table 3
Projected Flow Rates

Year	Estimated Average Annual Flow (mgd)
1990	0.55
1995	0.79
2000	1.0
2005	1.3
2010	1.5

If the City of Winters' recommended moderate water conservation program is implemented, the needed capacity of the wastewater treatment plant would be reduced from 1.5 to 1.3 mgd in 2010. For purposes of this report, a capacity of 1.5 mgd will be used for the year 2010.

Collection System Flow Projections

Flow rates in a wastewater collection system are determined by land use and peaking factors. Future land use was based on calculations of development potential under the General Plan adopted in May 1992. Flow rates for each land use classification were determined by studying the estimated housing densities, the types of schools (elementary, middle, or high school), and the projected types of commercial and industrial uses. The flow rates used for each zoning classification are shown in Table 4.

Table 4 Collection System Flow Rates	
Land Classification	**Flow Rates (gpad)**
Rural residential	500
Low density residential	1,500
Medium density residential	2,000
Medium/high density residential	2,500
High density residential	3,500
Neighborhood commercial	2,500
Highway service commercial	2,500
Central business district	3,500
Office	2,500
Planned commercial	2,000
Light industrial	2,000
Heavy industrial	3,000
Business industrial park	2,500
Planned commercial/business park	2,000
Recreation/parks	200
Schools	
Elementary	22,000
Middle	30,000
High	34,000
gpad = gallons per acre per day gpd = gallons per day from facility	

Daily fluctuations in the volume of wastewater are accounted for by the use of peaking factors. Peaking factors are the ratio of the peak flow to the average flow and are estimated to vary from 2.3 to 4.0 for the study area. As the average flow rate increases, the peaking factor generally decreases. Peaking factors are used to size collection systems and pump stations.

Existing Facilities

The existing facilities are composed of a gravity flow wastewater collection system, the East Street pump station and force main, El Rio Villa pump station and force main, the Walnut Lane lift station, a wastewater treatment plant, and a wastewater disposal system.

Collection System

The existing collection system consists of a network of 6-inch to 18-inch pipe. ECO Resources (formerly SOCI), which manages the wastewater system for the City, produces a yearly maintenance report and a list of necessary repairs. Refer to their maintenance report in Appendix A dated September 1990, for more detail.

Pipelines in Grant Avenue and East Street are the main collection lines for the entire City. The Grant Avenue lines appear to be at or near capacity as determined by discussions with City staff, SOCI records, and preliminary calculations. Grant Avenue pipelines are also reported to be in need of repair, which further reduces their capacity.

East Street Pump Station

The East Street pump station site was used as a wastewater treatment facility prior to 1980. Since that time, it has been used solely as a pump station. The pump station includes a Parshall flume, flow recorder, wet well, submersible pumps, pipeline cleaning facilities, emergency storage, an alarm system, and an emergency generator. An existing grinder is no longer in use. For purposes of this study, it was assumed that the grinder would not be replaced.

Wastewater enters the pump station and passes through the Parshall flume where flow is determined by a depth measurement device. The flow measurement device was replaced in December 1990. From the flume the wastewater continues into the wet well and then is pumped into the force main. The peak capacity of the existing pump station and force main is 2.7 mgd according to the City's operation and maintenance manual for the wastewater treatment facility.

The wet well contains three pumps: one rebuilt 47-hp pump for low flow conditions, one rebuilt 88-hp pump for peak flows, and one 88-hp pump for standby. The standby pump is about 10 years old and will need to be replaced during the next 5 to 10 years or as needed.

During an emergency situation such as a prolonged pump failure, the wastewater overflows the wet well and enters an emergency storage basin. The storage basin was

originally used as a primary clarifier. The basin will hold about 60,000 gallons or about 3 hours of flow. A standby generator was installed in April 1992 to allow the pumps to operate during a power failure.

The pump station alarm system is triggered by high pump discharge pressure or motor temperature, and high or low wastewater levels in the wet well. The alarm rings at the control building onsite. An automatic dialer has been installed to alert the operating staff of any alarm.

El Rio Villa Pump Station and Force Main

The El Rio Villa pump station collects the wastewater from El Rio Villa and pumps it into the 18-inch sewer trunk line at the intersection of Grant Avenue and East Street. The trunk delivers the El Rio Villa wastewater to the East Street pump station where it is pumped to the wastewater treatment facility.

In the past, the El Rio Villa force main was tied directly to the City's 14-inch force main. Surging problems resulting from interactions between the two pump stations appeared to cause multiple ruptures in the El Rio Villa force main. This problem was corrected when the El Rio Villa force main was reconnected to the gravity trunk instead of the City's force main.

Walnut Lane Lift Station

The Walnut Lane lift station is located on the southeast corner of Walnut Lane and Almond Drive. This station lifts the wastewater from the subdivision located along Almond Drive and Orchard Court into the gravity collection system on Walnut Lane.

Wastewater Treatment and Reuse

Prior to 1980, all wastewater was treated at the East Street pump station and discharged to Putah Creek. In 1980, new facilities were constructed north of the City (see Figure 2).

All collected wastewater from the East Street pump station is conveyed about 2.7 miles in a 14-inch force main to the existing treatment and reuse site. Major components of the treatment facility are four aeration basins, one polishing pond, three storage ponds, and a 140-acre reuse site of irrigated pasture. See Table 5 for additional design data. Wastewater from the 14-inch force main is discharged into the aeration basins. The aeration basins mix and aerate the wastewater to provide biological waste conversion. The partially treated wastewater is further treated in the polishing pond. The polishing pond allows settling of the waste and completes the biological conversion of organic

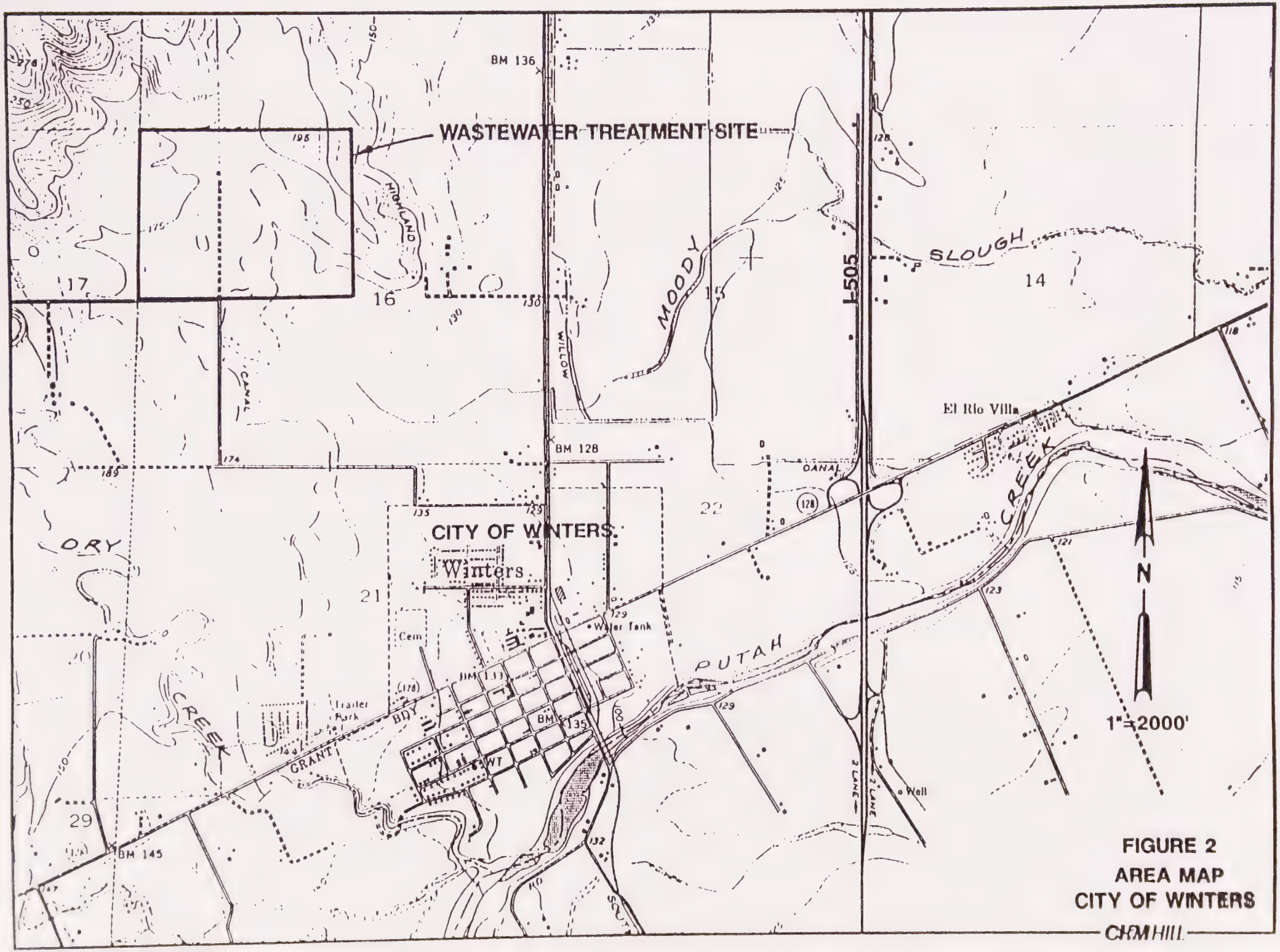

FIGURE 2
AREA MAP
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Table 5
Existing Wastewater Facilities Design Data

Component	Data
EAST STREET PUMP STATION	
Grinder Capacity (not in service)	3.5 mgd
Flow Measurement	
Type	Parshall Flume
Capacity	3.7 mgd
Pumps	
Number	3
Capacity, 2 @ 88 hp	1,400 gpm
Capacity, 1 @ 47 hp	475 gpm
Firm Capacity, with one pump out of service	2.7 mgd
FORCE MAIN	
Size	14 inch
Capacity	2.7 mgd
WASTEWATER TREATMENT	
Primary Ponds	
Number	2
Volume, each	0.68 MG
Aeration, each pond	15 hp
Secondary Ponds	
Number	2
Volume, each	1.2 MG
Aeration, each pond	20 hp
Polishing Pond	
Area	5.0 acres
Volume	14.6 MG
WASTEWATER REUSE	
System Capacity	0.7 mgd
Storage Ponds	
Pond No. 1 Area	8.9 acres
Pond No. 1 Volume	26.0 MG
Pond No. 2 Area	8.7 acres
Pond No. 2 Volume	25.4 MG
Pond No. 3 Area	5.6 acres
Pond No. 3 Volume	16.3 MG
Chlorinator	
Type	Chlorine gas, vacuum operated
Irrigation Pumps	
Number	2
Capacity, 11 hp	400 gpm
Capacity, 75 hp	1,000 gpm
Type	Vertical turbine
Land Application Site	
Area	140 acres
Sprinkler type	Fixed impact

Notes: gpm = gallons per minute
mgd = million gallons per day
MG = million gallons
hp = horsepower

waste material. The treated wastewater then flows to storage ponds where it is held until needed for irrigation. Chlorine is added for wastewater disinfection. Treated wastewater is applied to the reuse site with large nozzle sprinklers. A tailwater return flow system prevents runoff from leaving the site. This method of treatment produces effluent suitable for reuse only for livestock feed on sites remote from the public.

Capacity Estimate

The capacity of the existing wastewater treatment and reuse facilities as stated in the waste discharge requirements issued by the California Regional Water Quality Control Board (Regional Board) is 0.7 mgd, based on a 30-day average daily dry weather flow. The waste discharge requirements are shown in Appendix B. Treatment and reuse facility capacities are stated in terms of the average daily dry weather flow. The treatment and reuse facilities are limited by available storage capacity as determined by the water balance shown in Table 6.

For the last 3 years, storage Pond 3 has been operated at half full. The restricted operation followed reports that ground in the drainageway south of the pond was wet when the pond was full, but dry when it was half full. The Regional Board revised the wastewater discharge requirements to restrict the operation of Storage Pond 3 to 50 percent capacity and downgraded the wastewater treatment site capacity from 1.0 mgd to 0.7 mgd.

Several alternatives were evaluated to increase the capacity of the wastewater facilities. Modification of Pond 3 and construction of a new 40-acre-foot pond are the subject of a separate report. Capacity estimates of the modified facilities under various operating conditions were performed using a water balance to determine the capacity of the storage ponds and disposal facilities. The water balance uses statistics and engineering judgement to arrive at a capacity estimate and, therefore, results can be variable. The water balance is based on a return rainfall year that occurs once in 10 years, irrigation of a pasture crop, evaporation of 5 feet per year and various infiltration rates from the storage ponds. This analysis shows the importance of Pond 3 to the capacity of the wastewater system. The variations in capacity with and without modification of Pond 3 are the result of changes in percolation rates or water lost due to seepage. Modification of Pond 3 reduces the overall capacity of the wastewater facility by reducing seepage from the pond.

Table 7 illustrates that capacity available for new development at the existing facility ranges from zero, if the Regional Board finds that Pond 3 needs to be lined and no additional pond is built, to about 927 dwelling units assuming Pond 3 can be used to 100 percent capacity without a liner and a new 40-acre-foot pond is built. The number of allowable dwelling units include residential and associated commercial development such as service stations and mini-marts. They do not include large commercial business parks or industrial developments.

Table 6
Water Balance for Wastewater Storage
Based on 0.71 mgd Inflow

Maximum storage required = 201 acre-feet
Pond surface area = 28.6 acres
Land application area = 72 acres

Month	Wastewater Inflow (mg)	Wastewater Inflow (acre-ft)	10-year Precip. (in.)	Pond Evap. (in.)	Pond Seepage (in.)	Net Irrig. (in.)	Net Pond Evap. (acre-ft)	Net Irrig. (acre-ft)	Storage to/from (acre-ft)	Accumulated (acre-ft)
Oct	22.0	67.6	1.5	4.2	15.5	2.5	43.4	14.7	9	9
Nov	21.3	65.4	3.5	1.8	15.0	0.0	31.7	0.0	34	43
Dec	22.0	67.6	5.5	0.9	15.5	0.0	26.1	0.0	41	85
Jan	22.0	67.6	6.6	0.9	15.5	0.0	23.5	0.0	44	129
Feb	19.9	61.0	4.8	1.2	14.0	0.0	24.9	0.0	36	165
Mar	22.0	67.6	3.4	2.0	15.5	0.0	33.7	0.0	34	199
Apr	21.3	65.4	1.8	4.2	15.0	3.6	41.5	21.2	3	201
May	22.0	67.6	0.5	7.7	15.5	7.6	54.3	45.1	-32	170
Jun	21.3	65.4	0.2	9.3	15.0	9.2	57.4	55.0	-47	123
Jul	22.0	67.6	0.0	9.8	15.5	10.2	60.2	60.8	-53	69
Aug	22.0	67.6	0.1	8.9	15.5	8.8	57.9	52.4	-43	26
Sep	21.3	65.4	0.3	7.6	15.0	6.5	53.2	38.8	-27	0
Total	259.2	795.6	28.0	58.6	182.5	48.3	507.9	287.9	0	

Notes:

1. Net irrigation based on use of a return flow system and 80% irrigation efficiency.
2. Pond evaporation based on 70% of pan evaporation from Davis 2WSW Station.
3. Precipitation based on a 10-year return period from the Winters rain gage.
4. Storage pond capacity based on 50% of Pond 3, 50% of polishing pond, and 100% of Pond 1 and Pond 2. Capacity equals 206 acre-feet.

Legend:

mg = million gallons
ft = feet
mgd = million gallons per day
in. = inches

Table 7
Capacity Estimates for Various Operational Conditions

Operational Condition	Estimated Capacity	Approximate No. of New Homes	Storage Required (acre-feet)	Storage Available[a] (acre-feet)	Spray Fields Required (acres)	Spray Fields Available[b] (acres)
Existing Operation—Use Pond 3 (50%)	0.71 mgd	488	201	206	72	140
No Use of Pond 3, no new pond	0.43 mgd	None	181	181	68	140
Use Pond 3 with liner (100%), no new pond	0.55 mgd	None	231	231	88	140
Use Pond 3 without liner (100%), no new pond	0.76 mgd	618	227	231	85	140
Use Pond 3 without liner (100%), new 40-acre-foot pond	0.88 mgd	927	269	271	104	120
Use Pond 3 with liner (100%), new 40-acre-foot pond	0.64 mgd	280	268	271	103	120
Use Pond 3 without liner (50%), new 40-acre-foot pond	0.82 mgd	815	245	246	91	120

[a]Storage pond capacity with (1) 50% of Pond 3 and polishing pond and 100% of Ponds 1 and 2 = 206 acre-feet; (2) 100% of Ponds 1 and 2 and 50% of polishing pond = 181 acre-feet; (3) 100% of Ponds 1, 2, 3, and New Pond and 50% of polishing pond = 271 acre-feet; (4) 50% of Pond 3 and polishing pond and 100% of Ponds 1 and 2 and New Pond = 246 acre-feet.

[b]Spray fields available: 140 acres if no additional ponds built and 120 acres if 40-acre-foot pond built.

Existing Facility Improvements

Treatment Facilities

The existing wastewater treatment capacity should be expanded by building a new 40-acre-foot pond on the northern side of the existing pond site. The added capacity corresponds to about 265 dwelling units, assuming 120 gpcd and an average of 2.8 people per dwelling unit. As discussed in the previous section, the need for the modification of Pond 3 has not been determined and will be addressed in a separate report.

Adding interim improvements to the existing facility is the only method of gaining capacity that will allow the City to grow during the 2- to 3-year period needed for design and construction of the new facility.

The existing wastewater treatment facility should also be improved. There is erosion along some of the pond banks, apparently from wave action. These banks should be repaired as soon as possible. The lack of a vigorous grass stand in the reuse area limits the uptake of nutrients and encourages runoff. Grazing should be eliminated until a permanent crop can be established. The irrigation system needs to be improved to restore the automatic valves or to reduce the number of manual valves. Limited grading may improve the operation, but the benefits are unknown without a more detailed site investigation. The reuse area needs to be replanted after the irrigation system is improved. Establishment of a permanent grass stand will significantly improve the wastewater management system and improve the public perception of wastewater reuse. These improvements will increase the efficiency of the existing facilities.

Collection System and Pump Station

The East Street pump station recently had a generator installed for use as a backup power supply. The float lines that activate the pumps in the wet well need to be modified to prevent fouling. The alarm system has been modified to send a signal to a permanently staffed location or to the operator's residence after hours. These measures will reduce the potential for discharge of wastewater to Putah Creek.

Unused equipment at the pump station should be removed. The old clarifier, which is used for emergency wastewater storage, should be covered to improve appearance and safety. Sludge from the digester should be removed. The digester could be painted and left in place or removed.

For collection system improvements, refer to the SOCI report dated November 1989 in Appendix A. The SOCI report focuses on maintenance and repair items. Maintenance and repair of the main collector lines along Grant Avenue and East Street should be a high priority. Failure in either line could cause serious overflows in the City. The 8-inch pipeline between Hemenway and Railroad Avenue in Grant Avenue will be

replaced with a new 8-inch pipeline. The new pipeline will remove a portion of the flow entering the 10-inch pipeline and thereby allow additional sewer connections into the 10-inch pipeline. The City has proposed that the 8-inch pipeline located behind the houses along the east side of Taylor Street be replaced. A new 8-inch-diameter pipe should be located within the Taylor Street right-of-way. Portions of the existing 8-inch pipeline would remain in service to collect wastewater from the existing house laterals. Refer to the drawing in Appendix C for locations of the above improvements. To determine if additional pipelines are in need of replacement, the collection system should be televised as recommended by SOCI in 1989. See Table 8 for cost estimates for improving the existing facilities.

Table 8
Estimated Costs for Improving Existing Facilities

Item	Estimate
Wastewater Facilities	
Repair Pond 3 (if needed)[a]	$ 85,000
Build 40-acre-foot pond[b]	409,000
Repair pond bank and overflow [a]	12,000
Grade and plant reuse area[a]	25,000
Rework irrigation system[a]	35,000
Collection System Facilities	
Replace 8" Grant Avenue pipe with 8" pipe Hemenway Street to Railroad Avenue[b]	$ 72,000
Install 8" Taylor Street pipe[a]	25,000
Replace East Street P.S. pump[a]	20,000
Install backup generator[c]	50,000
Miscellaneous pump station improvements[a]	35,000
SOCI recommended repairs[a]	22,000
Subtotal	**$ 790,000**
Contingency (30%)	240,000
Subtotal	**$1,030,000**
Engineering, Legal, and Administration (20%)	210,000
Total	**$1,240,000**

[a]These improvements benefit existing users.
[a]These improvements benefit new development by providing additional capacity.
[c]The backup generator cost is allocated to existing users in the amount of $34,000 and to new development in the amount of $16,000. The generator was installed at the time this report was being prepared.

Future Collection System

Collection System

The proposed future collection system will be composed of about 63,500 feet of new gravity sewer pipe. The master plan collection system does not include house laterals or sewers within individual developments.

The assumptions used in the sizing of the pipe in the future collection system are as follows:

1. Minimum velocity = 2 feet per second
2. Maximum velocity = 7 feet per second
3. Pipe designed to flow 70 percent full design flow
4. Pipe roughness factor, Mannings n= 0.013
5. Minimum depth of cover over pipe = 5 feet
6. Minimum sewer size = 6 inches

The system was designed to reduce pumping costs by having all the sewage flow to one new pump station. Wastewater would gravity flow to the intersection of Main Street and Railroad Avenue. A new pump station at this intersection would pump the wastewater to the new treatment plant site.

The existing pipelines in Railroad Avenue, Walnut Lane, and East Main Street would be upgraded. This would allow additional development in these areas. These three pipelines drain into the existing 18-inch-diameter collector line that flows into the East Street pump station. The 18-inch pipe and pump station have the capacity to handle these additional flows. See Appendix D for a proposed layout of the collection system. Pipe sizes and lengths for the collection system are summarized in Table 9.

Table 9
Proposed Future Pipe Additions

Pipe Size (inches)	Length (ft)
6	20,500
8	15,400
10	12,600
12	6,900
15	6,900
18	1,200
Total	63,500

Pump Station

The new pump station would consist of a wet well, submersible pumps, above- ground control building, motor control center, and standby generator. It would be located near Railroad Avenue and Main Street. This pump station would combine the flows from the East Street pump station and all new incoming flows. Wastewater from the East Street station would be pumped through the existing 14-inch force main into the wet well of the new pump station. The new wet well would simultaneously be collecting the gravity flows from the new development and the East Street station flows. The new station would then pump the combined flows to the new treatment facility.

When the treatment facility is relocated, an estimated 1,700 feet of 14-inch-diameter force main will be required between the new pump station and the new treatment facility. Portions of the existing 14-inch force main could be used, but it is assumed that an all new pipeline is constructed. At peak flows, the pump station would operate at about 2,800 gpm with a velocity of 6.0 fps in the 14-inch force main.

Future Wastewater Treatment and Reuse

Wastewater management planning involves identifying efficient methods to return treated wastewater to a natural body of water or to accomplish beneficial reuse. The plan must protect public health, consider environmental issues, and comply with applicable laws, regulations, and policies. This section presents alternative plans to meet Winters' wastewater management needs to the year 2010.

Reuse alternatives were evaluated and the recommended alternative was chosen on an economic and beneficial reuse basis. The chosen reuse alternative determines the type and level of treatment that will be required. Various locations for the treatment facilities were evaluated and a recommended site was determined by weighing the advantages and disadvantages of each location.

Reuse Alternatives

The basis of this master plan is the development of treatment and reuse facilities suitable for the long-term needs of the community. The City has determined that the present method of treatment will be replaced with at least secondary treatment and that the effluent will be beneficially reused. This study compared the following alternatives for effluent reuse and disposal:

- Agricultural irrigation
- Landscape irrigation
- Recreational lake discharge
- Surface water discharge

Agricultural Irrigation

Agricultural irrigation is a proven wastewater management alternative and can be used on land surrounding the Winters area. Treated effluent is applied to meet the irrigation requirements of the crop. Effluent not used for irrigation during winter months can be stored onsite until the next irrigation season or discharged to surface waters. Components of agricultural reuse are a pumped delivery system, effluent distribution, and a return flow system. Secondary effluent is suitable for most crops except for food crops where there is direct contact between the treated wastewater and the crop. The primary functions of the crop are:

- To remove nutrients applied in the wastewater
- To help maintain soil infiltration capacity with the root system
- To dispose of applied wastewater through evapotranspiration

Agricultural irrigation was determined to be a component of the preferred alternative.

Landscape Irrigation

Landscape irrigation is a form of reuse similar to crop irrigation. Landscape irrigation has the advantage of reducing demand for city water supplies. In most cases, the irrigated areas are publicly owned or provided by private owners, saving land acquisition costs. As discussed for crop irrigation, either winter discharge or additional storage will be required during the winter months. But beyond vegetation, the major difference between these irrigation alternatives is the potential for public contact. For this reason treatment requirements are greater.

Landscape irrigation falls within two categories:

Category 1. Golf courses, cemeteries, and freeway landscapes where human contact with the turf or vegetation is limited

Category 2. Parks, playgrounds, school yards, and home yards where human contact with the turf, especially by children, is common

California Administrative Code, Title 22, Division 4 prescribes criteria for wastewater reclamation. Category 1 requires a disinfected secondary effluent. For reliability, effluent filtration is normally used. Category 2 requires a disinfected, filtered secondary effluent and chemical coagulation. An extended disinfection contact time of 2 hours with chlorine is also recommended. Redundancy features, alarms, backup power, and emergency storage are further safety measures. These redundancy features are of more concern for reuse alternatives involving direct public contact, such as playgrounds.

Landscape irrigation for golf courses and similar areas (Category 1 reuse) was determined to be a component of the preferred alternative.

Recreational Lake Discharge

A recreational lake is provided in the Winters General Plan. Lake discharge was determined to be unsuitable for The City of Winters due to problems of water quality in the lake and impacts to the groundwater basin.

Surface Water Discharge

Available surface water discharge alternatives are Dry Creek, Moody Slough, Willow Canal, and Putah Creek. Moody Slough flows east through Dry Slough and Willow Slough to the Yolo Bypass. Putah Creek flows east from Lake Berryessa to the Putah Creek Sinks in the Yolo Bypass. Dry Creek flows into Putah Creek from the northwest. Willow Canal, owned by the Yolo County Flood Control and Water Conservation District, serves agricultural users between Winters and Davis.

Treatment requirements for a surface water discharge would be similar to the requirements recently imposed on the Davis campus wastewater discharge. The requirements are summarized in Table 10. Additional treatment may be imposed if the stream is subject to nonrestricted recreational use.

Table 10 Probable Surface Discharge Requirements	
Constituent	**Limits**
BOD_5 and Suspended Matter	10 mg/l summer 20 mg/l winter
Total Coliform Organisms	23 MPN/100 ml
Chlorine Residual	0.1 mg/l
pH	6.5 to 8.5

Probable Receiving Water Limitations:

1. Dissolved oxygen shall not fall below 5.0 mg/l.
2. Normal ambient pH shall not change by more than 0.5 units.
3. Normal ambient temperature shall not increase more than 5° F.
4. Discharge shall not violate any water quality standards or in any manner cause any diverse impacts on the receiving water.
5. The City shall implement an effluent toxicity monitoring program for estimating chronic toxicity to freshwater organisms.

The ability of the discharge to meet receiving water limitations for temperature is unknown. The other requirements can normally be met by treatment. Stream monitoring and treated effluent testing would need to be completed to determine the viability of this alternative.

The beneficial uses of Putah Creek are industrial and agricultural supply, recreation, aesthetic enjoyment, and preservation and enhancement of fish, wildlife, and other aquatic resources. According to the Department of Fish and Game, the creek downstream of Winters supports a warm water fishery and, to a lesser degree, a cold water fishery. Flows in the creek are controlled by releases made by Solano Irrigation District. The amount of this flow is the subject of litigation between the irrigation district and Putah Creek Council. Beneficial uses of the other surface waters are unknown but could include agricultural supply, wildlife habitat, and other aquatic resources.

Surface water discharge could be year-round or seasonal. If seasonal, treated wastewater could be used for agricultural reuse or landscape irrigation during the summer and discharged during the winter to reduce storage requirements. Year-round discharge is not recommended because reuse alternatives are available and summer discharges may face additional restrictions on treatment and monitoring.

Surface water discharge during the winter is the recommended alternative. Treated wastewater will be used to augment Putah Creek flows during the winter months and

used for agricultural or landscape irrigation in the summer. The treated wastewater could also be used on wetlands that were developed in the area.

The recommended plan is a treatment plant that will produce effluent that meets the winter discharge standards for Putah Creek. This alternative provides flexibility for beneficial reuse without going to extreme cost. The effluent from the recommended treatment plant can be reused for fodder crops, other non-food crops, golf courses, and cemetery irrigation, and discharged to Putah Creek in the winter. It cannot be used for parks or playgrounds or recreational lakes, nor can it be discharged to Putah Creek in the summer. This type of facility can also be upgraded to provide cleaner water for additional reuse options in the future.

Treatment Facilities

Two alternative locations and various combinations of the recommended reuse options were evaluated. The existing site was compared to a new site east of County Road 89.

Advantages of the existing site are that no land acquisition would be needed for the new facility and existing ponds could be used, thus saving on construction costs. There is a small savings in pumping costs to the golf course and local farmlands because of the elevation of the facility. However, these savings are offset by the increased pumping costs from the East Street pump station.

Disadvantages of the existing site are primarily due to the facilities location. It is located in an area that may be used for residential development and a golf course. It is probable that there will be complaints from residential land owners regarding odors, noise, and aesthetics. The storage ponds are also located upgradient from the City's domestic water supply. The distance and elevation of the existing facilities from the pumping facilities will increase operation and maintenance costs.

The advantages of the new site are primarily due to location. This site would be surrounded by land zoned agricultural, parks, and industrial. This zoning greatly reduces the likelihood of complaints due to odor, noise, and aesthetics. This location is about 50 feet lower in elevation than the existing site. With a 50-foot reduction in elevation, the initial cost for the new pumping station is substantially reduced and operation of the station in the future would be less expensive.

The disadvantages of the new site are the costs to acquire the site. This site is also located near the 100-year flood zone and may require flood protection such as diking around the facility. It may be possible to sell the current site to help defray costs of acquiring the new site.

One option that was discarded was the concept of operating two wastewater facilities at different sites. Development of two treatment facilities with similar functions is not

recommended because of construction and operating costs. There is considerable economy of scale at this capacity level. Two small treatment facilities could cost more than one facility, depending on site development and other variables.

Recommended Plan

The recommended plan is to construct a new facility at a new site. The recommended plan includes the following:

- Build new treatment facility with a capacity of 1.0 mgd
- Build about 100 acre-feet of regulating ponds or use the existing storage ponds
- Connect to abandoned 14-inch force main to irrigate planned golf course and build pipeline to local farmers for summer irrigation for about 150 acres of land including the golf course
- Build pipeline to existing storm drainage system

When flows approach 1.0 mgd:

- Expand plant to 1.5 mgd
- Identify an additional 60 acres of land to be irrigated in the summer

This plan reduces the potential of noise, odor, and aesthetic problems associated with the present site. Initial costs are lower for the new pump station, force main, and reuse piping. Overall costs may be decreased by the possibility of selling the existing site.

The recommended wastewater treatment plant is an activated sludge process that will provide a filtered, disinfected secondary effluent. This level of treatment allows for flexibility in methods of beneficial reuse and is easily enlarged or upgraded to accommodate the changing needs of the City.

Cost Estimates

Cost estimates for Winters Sewer Master Plan are order-of-magnitude cost estimates. The American Association of Cost Engineers definition of an order-of-magnitude estimate is an approximate estimate made without detailed engineering data. These costs were developed from cost curves, scale-up or scale-down factors, previous studies, and experience. It is normally expected that an estimate of this type would be accurate within +50 percent to -30 percent. These percentages should be viewed as statistical confidence limits and should not be confused with contingencies.

These cost estimates have been prepared for guidance in evaluating various options from information available at the time of the estimate. Final construction costs will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors. As a result, final project costs will vary from these estimates presented herein. Therefore, project feasibility and funding needs must be carefully reviewed prior to making financial decisions to help ensure making the best choice of option with adequate funding.

The costs presented herein are based on March 1992 costs.

A construction cost contingency allowance of 30 percent of the subtotal was included based on suggested allowance factors presented by the American Society of Civil Engineers (ASCE). The 30 percent factor is recommended until more detailed engineering data are known. The resulting cost after applying the contingency allowance is the estimated construction cost.

Nondirect costs associated with engineering, construction management, administration, and legal were included using a nondirect cost allowance of 20 percent of the construction cost. This allowance was also based on factors suggested by ASCE.

Collection System

Table 11 summarizes estimated costs for the recommended collection system. Based on using vitrified clay pipe, these costs include pipe and installation assuming the use of a trench shield at pipe depths over 5 feet. Unit costs will be higher if groundwater is encountered during construction. Force main costs are based on Class 50 ductile iron pipe and include fittings and installation. Manhole costs are based on a standard 48-inch-diameter manhole for pipe up to 24 inches and on 60-inch-diameter manholes for pipe larger than 24 inches. Manholes were assumed at 400-foot intervals.

Table 11 Estimated Costs for Wastewater Collection				
Item	Quantity	Unit	Unit Cost $	Estimate ($1,000)
6″ Pipe				
6 to 10 feet deep	16,700	lin ft	31	518
11 to 15 feet deep	3,400	lin ft	45	153
16 to 20 feet deep	400	lin ft	58	23
8″ Pipe				
6 to 10 feet deep	4,100	lin ft	33	135
11 to 15 feet deep	8,400	lin ft	48	403
16 to 20 feet deep	2,900	lin ft	62	180
10″ Pipe				
11 to 15 feet deep	7,900	lin ft	53	419
16 to 20 feet deep	4,700	lin ft	67	315
12″ Pipe				
11 to 15 feet deep	3,500	lin ft	56	196
16 to 20 feet deep	3,400	lin ft	71	241
15″ Pipe				
11 to 15 feet deep	2,300	lin ft	65	150
16 to 20 feet deep	900	lin ft	81	73
21 to 25 feet deep	900	lin ft	97	87
26 to 30 feet deep	2,800	lin ft	113	316
18″ Pipe				
16 to 20 feet deep	1,200	lin ft	89	107
48″ Manhole				
6 to 10 feet deep	54	ea	1,600	86
11 to 15 feet deep	65	ea	2,300	150
16 to 20 feet deep	35	ea	3,100	109
60″ Manholes				
21 to 25 feet deep	2	ea	5,000	10
26 to 30 feet deep	8	ea	6,100	49
Subtotal				3,720
Contingency (30%)				1,120
Subtotal				**4,840**
Engineering, Legal, and Administration (20%)				970
Total				**5,810**
Note: These improvements are needed for new development.				

Wastewater Treatment and Reuse

Wastewater treatment and reuse costs are shown in Tables 12 and 13.

Table 12
Estimated Costs for Wastewater Treatment Facilities
($1,000)

Item	1.0 mgd	Expansion to 1.5 mgd
Headworks	$ 350	$ 150
Oxidation ditch	900	300
Clarifiers	650	500
Pump station	600	250
Sludge handling	400	250
Landscaping	80	30
Operations building	300	--
Site improvements	300	200
Effluent filtration	600	500
Telemetry	150	--
Subtotal	**$4,330**	**$2,180**
Contingency (30%)	1,270	620
Subtotal	**$5,600**	**$2,800**
Engineering, Legal, and Administration (20%)	1,100	500
Total	**$6,700**	**$3,300**
Grand Total (dollars)	**$10,000,000**	

All piping for wastewater conveyance was assumed to be Class 150 PVC pipe. Golf course piping costs are based on delivering 4.5 acre-feet per acre per year. Piping to farmlands was based on supplying an average of 3.4 acre-feet per acre per year. Flows were delivered to farmlands near Six-Pac at an elevation of 132 feet. Pond construction is based on 9-foot depths, 3:1 sideslopes, 15-foot top of bank width, 3-foot freeboard, and a balanced cut and fill of onsite material.

Table 13
Estimated Costs for Wastewater Pump Stations and Piping

Item	Quantity	Unit	Unit Cost ($)	Estimate ($1,000)
New pump station	1	ea	685,000	685
14″ Pipe to Treatment Plant	1,700	lin ft	63	107
Reuse facilities				
14″ pipe to golf course	900	lin ft	63	57
12″ pipe to 80 acres of farmland	500	lin ft	50	25
100 ac-ft of ponds	1	ea	200,000	200
14″ pipe to storm drain	4,500	lin ft	63	284
Pump station	1	ea	58,000	58
Subtotal				**1,416**
Contingency (30%)				424
Subtotal				**1,840**
Engineering, Legal, and Administration (20%)				360
Total				**2,200**

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Appendix A
Sewer Repair Report

SEWER CLEANING, SEWER LINE

AND

SEWER MANHOLE REPAIR REPORT

1989

CITY OF WINTERS

NOVEMBER, 1989

SOCI

November 15, 1989

Mr. Perry Beck
City Manager
City of Winters
318 First Street
Winters, CA 95694

RE: Sewer Cleaning, Sewer Line and Sewer Manhole Repair Report, 1989

Dear Perry:

The attached total report is presented in three sections.

Section #1 - Sewer Cleaning Report

This report is the contracted annual sewer cleaning report. The report illustrates the location of sewers, manhole locations, sewer pipe size, sewer pipe length between manholes, type of pipe, invert street depth dimensions and remarks on what was found during the cleaning operation. The total footage cleaned was 49,017 feet. As was previously reported to the City there are sections that cannot be cleaned due to manholes being paved over. This condition precludes us from cleaning. It is our understanding that the City is arranging to have these raised. Upon completion, SOCI will complete the cleaning operation. From a contractual point of requirement it appears that when these areas are completed the total footage will be quite close to the 58,000 feet estimated.

Section #2 - Sewer Line Obstructions

This section addresses problems found in the sewer line system during the cleaning operation. It is imperative that these problems be accurately identified and then mitigated. Associated costs are furnished to complete the identification necessary.

Section #3 - Manhole Repair Recommendation

During the sewer cleaning operation, SOCI provided additional staff to conduct a "Manhole Condition" survey. This survey is furnished under a separate cover entitled "Manhole Condition Report." This section depicts several manholes that require immediate repair. A description and associated costs are furnished.

Recommendations

The inspection and repair work depicted in this report are considered to be very high priority. SOCI recommends that the sewer line inspection and manhole repair work be accomplished as soon as possible.

Very truly yours,

Lloyd D. Hedenland
Vice President

cc: Operations

SOCI

SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 9/29/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INVERTS UPPER	MH INVERTS LOWER	PROBLEMS
East & Baker	1	2	6"	333'	clay	146"	146 3/4	MH pipes need chipping for proper flow.
East & Baker	1	6	14"	350'	clay	146"	146 3/4	none
East & Baker	1	4	8"	363'	clay	146"	146 3/4	none
East & Baker	1	7	14"	300'	clay	146"	146 3/4	none
Baker St.	4	5	8"	365'	clay	57"	57½"	Very Dirty
East & Morgan	5	8	8"	325'	clay	37"	38"	none
Between Railroad & East	2	3	6"	514'	clay	43"	43½"	At 300' hit unknown blockage TV recommended. Needs ring W
East & Edwards	7	11	8"	379'	clay	149"	149½"	None
East & Abbey	9	7	14"	303'	clay	165"	166"	MH 9 has high co levels
East & Abbey	9	10	8"	894'	clay	165"	166"	350' hit unknown blockage TV recommended
East & Elliott	13	c/o	8"	147'	clay	58"	58½"	none
East & Elliott	13	unlocatable MH or c/o	6"	350'	clay	58"	58½"	Could not locate MH or c/o at end of Elliott St.
East & Main	12	13	6"	520'	clay	160'	161'	Influeant pipes going to MH 12, need chipping repair.
East & Main	12	9	14"	302'	clay	160"	161"	none
East St. Plant entrance	14	12	14"	200'	clay	115"	117"	none
Russell & 4th.	15	16	8"	378'	clay	45"	46"	none
Riverview Ct.	17	18	8"	489'	clay	45"	46"	none
Russell & 3rd.	19	15	8"	460'	clay	64"	64½"	Heavy root infultration in floor of MH, heavy debris

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SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 9/29/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INVERTS UPPER	MH INVERTS LOWER	PROBLEMS
Russell & 3rd.	21	23	8"	316'	clay	64½"	65"	none
Russell & 3rd.	21	c/o	8"	450'	clay	64½"	65"	none
Russell & 2nd.	24	21	8"	462'	clay	82"	83"	none
Russell & 2nd.	24	25	8"	403'	clay	82"	83"	none
Russell & 1st.	26	24	8"	460'	clay	105"	107"	none
Russell & 1st.	26	27	8"	255'	clay	105"	107"	none
Russell & 1st.	26	28	8"	469'	clay	105"	107"	At approx. 400' hit unknown blkge heavy mud TV recom.
Wolfskill & 1st.	27	25	6"	485'	clay	69"	75"	MH needs repairs on influent pipes for proper flow.
Railroad & Baker	29	30	8"	462'	clay	130"	131"	MH needs ring work
Railroad & Baker	29	31	12"	301'	clay	130"	131"	MH needs ring work
Railroad & Edwards	31	32	8"	464'	clay	119"	120"	none
Railroad & Edwards	31	10	12"	301'	clay	119"	120"	none
Railroad & Abbey	10	33	8"	460'	clay	115"	115 3/4	Floor of MH needs extensive repairs to pipes & floors
Abbey btwn Main & Russell at 3rd.	34	MH at 4th couldn't find	8"	461'	clay	46½"	47"	MH stacked, vactor blkge cleared TV recom.
Alley btwn. Main & Russell at 1st.	35	36	8"	460'	clay	51"	52"	MH needs mortar work, sand in line, TV recom.
" " "	35	26	8"	147'	clay	51"	52"	" " "
" " "	35	c/o	8"	426'	clay	"	"	" " "
Main & Emery	37	c/o	8"	328'	clay	35"	35½"	Sand in line when cleaned TV recom. vactored
								Heavy buildup in MH

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SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 10/4/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INVERTS UPPER	MH INVERTS LOWER	PROBLEMS
Main & 4th	39	38	8"	577'	clay	63"	64"	Heavy build up in MH vactored MH needs floor work.
Main & 4th	39	c/o	8"	183'	clay	63"	64"	Heavy build up in MH vactored MH needs foor work
Main & 4th	39	40	8"	157'	clay	63"	64"	Heavy build up in MH vactored MH needs floor work.
Russell & Emery	41	c/o	6"	324'	AC	29"	30"	approx. 210' dwn. hit obstruc TV recommended
Russell, just West of Riverview Ct.	42	41	6"	394'	clay	44"	45"	none
Russell, just West of Riverview Ct.	43	42	6"	385'	clay	41"	41½"	none
Alley btwn Main & Abbey at 2nd.	44	45	8"	459'	clay	94"	94½"	Vactored, MH floor needs minor repairs.
Alley btwn Main & Abbey at 1st.	46	44	8"	460'	clay	113"	113½"	none
" "	46	47	8"	360'	clay	113"	113½"	none
" "	46	c/o	8"	410'	clay	113"	113½"	none
Abbey & 4th.	48	49	6"	605'	clay	36"	37"	MH vactored
Abbey & 3rd.	50	48	6"	465'	clay	57"	58"	MH vactored, roots infultrati ng MH floor.
" "	50	51	6"	285'	clay	57"	58"	" " "
Abbey & 2nd.	52	33	6"	458'	clay	68"	68½"	Vactored MH, heavy debrie & sand TV recommended.
" "	52	50	6"	460'	clay	68"	68½"	" " "
Abbey & 1st.	33	32	8"	302'	clay	118"	119"	approx. 175' hit obstruction in line, TV recommended
Alley/Main & Abbey	45	40	8"	456'	clay	73"	73½"	none
Baker & Third	53	54	6"	315'	clay	64"	65"	none

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SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 10/4/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INVERTS UPPER	MH INVERTS LOWER	PROBLEMS
Baker & 1st.	30	55	6"	470'	clay	64"	65"	Heavy dirt on run back of cleaning, TV recommended
Baker & 1sr.	30	32	6"	300'	"	64"	65"	none
Baker & 1st	30	56	6"	300'	"	64"	65"	none
Edwards & 2nd.	57	52	6"	300'	"	90"	92"	MH repairs needed, 110' hit obstruction, TV recommended
Edwards & 2nd.	57	55	6"	300'	"	90"	92"	200' hit obst. TV recom.
Baker & 4th.	58	53	6"	465'	"	29"	30"	none
Baker & 4th	58	c/o	6"	400'	"	29"	30"	none
Edwards & Haven	59	60	6"	550'	"	66"	68"	MH needs channel work
Edwards & 4th	61	48	6"	301'	"	61"	62"	Extensive repairs needed MH
Edwards & 4th	61	59	6"	570'	"	61"	62"	" " "
Edwards & 4th	61	58	6"	310'	"	61"	62"	" " "
Edwards & 3rd.	51	61	6"	470'	"	83½"	84"	none
Edwards & 3rd.	51	57	6"	462'	"	83½"	84"	none
Main & Edwards	62	63	6"	295'	PVC	53"	54"	none
Main & Edwards	62	c/o	6"	120'	"	53"	54"	none
Edwards St.	60	64	6"	150'	"	56"	57"	none
Edwards St.	64	65	6"	260'	"	58"	59"	none
Drycreek & Abbey	66	63	6"	225'	"	34"	35"	none
						33"	33"	none

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SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 10/4/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INVERTS UPPER	MH INVERTS LOWER	PROBLEMS
Main & Cody	69	65	6"	380'	PVC	54"	55"	none
Nieman St.	37	41	6"	500'	"	38"	39"	none
Cody & Drycreek	70	71	6"	485'	"	34"	35"	none
Drycreek Rd.	71	66	6"	222'	"	46"	47"	none
Carrion Cir.	72	73	8"	285'	"	97"	98"	none
Anderson & Carrion	74	75	8"	280'	"	127"	128"	none
Anderson & Carrion	74	76	8"	275'	"	127"	128"	none
Carrion Cir.	73	77	8"	175'	"	97"	98"	none
Nieman & Almeria	78	79	6"	425'	"	51"	52"	none
Anderson & Hemenway	80	81	6"	260'	clay	124"	125"	none
Anderson & Hemenway	80	82	6"	200'	"	124"	125"	none
Hemenway & Lenis	82	83	6"	261'	"	105"	106"	none
Hemenway & Rosa	82	84	6"	275'	"	105"	106"	MH 84 high co levels & combustibles, hot MH
Mermod & Lenis	83	82	6"	500'	PVC	117"	118"	none
Mermod & Rosa	85	83	6"	270'	"	114"	114½"	none
Anderson & Mermod	75	83	6"	265'	"	118"	119"	none
Anderson & Mermod	75	80	6"	495'	"	118"	119"	none
Hill Pl.	86	81	6"	215'	"	50"	48"	none

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SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 10/4/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INTERVALS UPPER	MH INTERVALS LOWER	PROBLEMS
Anderson Ave	89	D.E. c/o	6"	443'	PVC	73"	72"	Hit obstruction 250' line TV recommended
Anderson & Hill	81	89	"	260'	"	70"	69"	none
Apricot Ave.	89	90	"	520'	"	63"	64"	none
Anderson	91	89	"	275'	"	60"	61"	none
Apricot & Peach	93	91	"	250'	"	77"	78"	none
Apricot Ave.	91	92	"	150'	"	60"	61"	none
Martinez	95	94	"	400'	"	36"	36 3/4	none
Martinez & Malaga	94	96	"	400'	"	35"	35½"	none
Apricot & Rosa	92	84	"	260'	"	77"	77 3/4	none
Village & Berryesa	97	98	"	247'	"	75½"	75 3/4	none
Village & Hillview	101	97	"	262'	"	70"	71"	none
Village & Hillview	102	101	"	451'	"	67"	70"	none
Village & hillview	103	102	"	256'	"	56½"	56 3/4	none
Hillview Ln	100	103	"	453'	"	56½"	57½"	none
Hillview Ln.	100	101	"	132'	"	56½"	57½"	none
Village Cir.	98	106	"	126'	"	80½"	82"	none
Village Cir	106	106	"	379'	"	56 5/8	56 3/4	none
Village Cir	97	99	"	210'	"	75½"	75 3/4	none
								wire needs resealing

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SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 10/4/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INVERTS UPPER	MH INVERTS LOWER	PROBLEMS
N. East St.	107	109	8"	183'	PVC	101"	101½	MH rims need resealing
N East St.	110	109	8"	349'	PVC	93½"	94"	Rims need reworking, chunks of concrete in MH high co level.
Almond Dr.	114	113	8"	327'	PVC	96½"	963/4	Heavy gravel when cleaned TV recommended.
Almond Dr.	113	107	8"	340'	PVC	126¼"	128¼"	Vactored ring needs work on MH
W. East & Almond	107	117	8"	386'	PVC	60 3/4	161 3/4	Rims need resealing MH
W. East & Almond	107	118	8"	440'	PVC	62 3/4	163"	None
Orchard Ct.	116	c/o	6"	125'	PVC	81"	81 3/4	None
Almond & Orchard	115	116	8"	405'	PVC	99 3/4	100"	None
N. East & Almond	110	111	6"	100'	clay	57½"	58 3/4	MH needs work for pipes entering MH at intersection
Village nr Neiman	105	117	6"	118'	PVC	47"	48"	None
Hemenway St.	80	88	8"	195'	clay	62"	62½"	None
Hemenway St.	119	84	6"	301'	clay	49½"	50"	None
Rosa Ave. & Mermod	85	119	8"	495'	clay	70 3/4	72"	None
Almeria Dr.	78	95	8"	202'	PVC	53"	54"	None
Almeria Dr.	95	119	8"	253'	PVC	38"	38 3/4	None
Neiman & Almeria	119	120	8"	232'	PVC	47½"	48"	None
E. Main	124	125	8"	263'	PVC	178"	178 3/4	None
E. Main	124	123	8"	215'	PVC	178"	178 3/4	None

SOCI, INC.
SEWER CLEANING LOG

CITY Winters
SYSTEM
DATE 10/4/89

STREET	FROM MH NO.	TO MH NO.	PIPE SIZE	PIPE LENGTH	PIPE TYPE	MH INVERTS UPPER	MH INVERTS LOWER	PROBLEMS
E. Main & Lauren Ct	123	122	8"	258'	PVC	146"	147"	None
E. Main & Lauren Ct	123	125	8"	130'	PVC	146"	147"	None
E. Main & Caselli c	125	126	8"	368'	PVC	116"	116 3/4	None
E. Main & Morgan	126	unknown c/o	8"	approx. 150'	PVC	116"	116 3/4	None
E. Main & Morgan	126	127	8"	355'	PVC	116"	116 3/4	None
Morgan & Baker	127	8	8"	351'	PVC	92"	93"	None
Morgan & just pass Baker	8	128	6"	275'	PVC	49"	49½"	None
Nicman St.	117	104	6"	500'	PVC	47½"	47 3/4"	None
Nicman St.	104	118	6"	196'	PVC	46"	46 3/4"	None
Nicman St.	118	119	6"	530'	PVC	49½"	50"	None
				3013'				

SEWER LINE OBSTRUCTIONS

The following table illustrates the various areas in the Sanitary Sewer System that have unknown problems. These are areas that our sewer cleaning crews could not pass the equipment through the line or found material that is indicative of broken sewer line or separated joints. These are high risk problems from a sewer overflow potential and also are potential high groundwater infiltration points.

It is recommended that these areas be televised to ascertain the problem of facilitate proper repair.

CITY OF WINTERS
UNKNOWN PROBLEM AREAS
TELEVISION INSPECTION RECOMMENDED

Problem Area w/Manhole # Reach	Footage Location of Problem	Problem	Method Of Inspection	Cost
#2 to #3	300'	Blockage	Televise	$405.00
#9 to #10	350'	Blockage	Televise	$405.00
#26 to #28	400'	Blockage w/heavy mud	Televise	$405.00
#34	throughout 461'	Blockage	Televise	$540.00
#35 to #36	throughout 460'	Blockage w/sand	Televise	$540.00
#35 to #26	throughout 147'	Blockage w/sand	Televise	$540.00
#35 to c/o	throughout 426'	Blockage w/sand	Televise	$540.00
#37 to c/o	throughout 328'	Blockage w/sand	Televise	$540.00
#37 to #38	throughout556'	Blockage w/sand	Televise	$540.00
#41 to c/o	210'	Obstruction	Televise	$405.00
#52 to #33	throughout 458'	Sand	Televise	$540.00
#52 to #50	throughout 460'	Sand	Televise	$540.00
#33 to #32	175'	Obstruction	Televise	$405.00

CITY OF WINTERS
UNKNOWN PROBLEM AREAS
TELEVISION INSPECTION RECOMMENDED

Problem Area w/Manhole # Reach	Footage Location of Problem	Problem	Method Of Inspection	Cost
#30 to #55	throughout 470'	Sand	Televise	$540.00
#57 to #52	110'	Obstruction	Televise	$405.00
#57 to #55	200'	Obstruction	Televise	$405.00
#89 to c/o	250'	Obstruction	Televise	$405.00
#114 to #113	throughout 327'	Heavy gravel	Televise	$540.00
			Total Cost:	**$8,640.00**

MANHOLE REPAIR

The following table describes various manhole problems within the sanitary sewer system. The manholes listed in this table are the worst case problems. All listed have a very high priority for repair.

Others within the system can be addressed on a scheduled yearly maintenance program to preclude failure.

CITY OF WINTERS
SANITARY SEWER SYSTEM
MANHOLE FAILURES
REPAIR RECOMMENDATIONS

Manhole #	Problem Area w/Manhole	Problem	Method of Repair	Cost
1	Inlet & outlet piping	Poor flow conditions no seal	Chip, seal around piping & reform entrance & exit	$550.00
4	Ring cover	Ring grout gone	Re-grout ring	$100.00
8	Inlet & outlet piping	Poor flow conditions no seal	Chip, seal around piping & reform	$550.00
13	Channel floor	Root intrusion	Chip & seal shaft & floor joint reform floor	$700.00
18	Inlet & outlet piping	Poor flow conditions	Chip, seal around piping & reform	$550.00
20	Inlet & outlet piping	Poor flow conditions	Chip, seal around piping & reform	$550.00
21	Ring cover	Ring grout gone	Re-grout ring	$550.00
23	Inlet & outlet pipes; channel floor area	Inlet & outlet piping broken & not sealed. Channel floor needs replacing	Chip & seal piping & shaft joint. Reform floor	$700.00
26	Manhole shaft	Shaft has cracks	Chip, seal &	$550.00

CITY OF WINTERS
SANITARY SEWER SYSTEM
MANHOLE FAILURES
REPAIR RECOMMENDATIONS

Manhole #	Problem Area w/Manhole	Problem	Method of Repair	Cost
29	Floor & channel	Heavy concrete left in floor & channel	Chip & remove	$300.00
30	Floor area	Heavy root intrusion in floor area	Chip & re-seal floor joint area	$550.00
34	Floor area	Cracks/minor	Chip & seal	$300.00
38	Floor joint	Root intrusion	Chip & re-seal	$550.00
48	Shaft, floor & channel	Cracks & deterioration	Chip, seal & recoat shaft	$800.00
49	Shaft & floor area	Cracks	Chip & seal	$550.00
51	Flow channels	Channel inlet & exit poor flow conditions	Chip & reform channel & apron	$550.00
52	Shaft & floor	Cracks & deterioration	Chip, seal & recoat shaft	$800.00
01	Ring cover	Ring grout gone	Re-grout ring	$100.00
02	Ring cover	Ring grout gone	Re-grout ring	$100.00

CITY OF WINTERS
SANITARY SEWER SYSTEM
MANHOLE FAILURES
REPAIR RECOMMENDATIONS

Manhole #	Problem Area w/Manhole	Problem	Method of Repair	Cost
103	Ring cover & floor	Ring grout gone concrete left in floor channel	Re-grout, chip & remove concrete	$300.00
106	Ring cover	Ring grout gone	Re-grouting	$100.00
110	Shaft & floor	Shaft cracked & deteriorated, floor channel broken	Chip, seal & recoat shaft, repair floor	$800.00
112	Channel floor & inlet pipe	Channel floor broken Inlet pipe extended	Chip & repair floor. Chip & seal inlet pipe	$550.00
116	Shaft	Shaft cracked & deteriorated	Chip, seal & recoat shaft	$800.00
126	Shaft & joint	Shaft joint seal failure	Chip & re-seal shaft joint	$550.00
134	Capped line	Leakage from cap	Re-seal	$100.00
			Total Cost:	$12,600.00

Appendix B
Waste Discharge Requirements

STATE OF CALIFORNIA

PETE WILSON, Gover

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
CENTRAL VALLEY REGION
3443 ROUTIER ROAD, SUITE A
SACRAMENTO, CA 95827-3098
PHONE: (916) 361-5600
FAX: (916) 361-5686

26 November 1991

CERTIFIED MAIL
P057282152

Mr. Perry Beck, City Manager
City of Winters
318 First Street
Winters, CA 95694

TRANSMITTAL OF ADOPTED WASTE DISCHARGE REQUIREMENTS

Enclosed is an official copy of Order No. 91-232 as adopted by the California Regional Water Quality Control Board, Central Valley Region, at its last regular meeting.

Kenneth D. Landau

KENNETH D. LANDAU
Senior Engineer

RPM:mdm

Enclosures - Adopted Order
Standard Provisions (discharger only)

cc+encl: Department of Health Services, Office of Drinking Water, Sacramento
Department of Fish and Game, Region 2 Rancho Cordova
Department of Water Resources, Central District, Sacramento
State Water Resources Control Board, Office of Chief Counsel, Sacramento
State Water Resources Control Board, Division of Water Quality, Sacramento
Yolo County Department of Environmental Health, Woodland
Yolo County Planning Department, Woodland
Mr. Joseph Iolati, Manager, City of Winters Treatment Plant, Winters

TATE OF CALIFORNIA
PETE WILSON, Governor

ALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
ENTRAL VALLEY REGION
443 ROUTIER ROAD, SUITE A
CRAMENTO, CA 95827-3098
ONE: (916) 361-5600
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State Water Resources Control Board, Division of Water Quality, Sacramento
Yolo County Department of Environmental Health, Woodland
Yolo County Planning Department, Woodland
Mr. Joseph Iolati, Manager, City of Winters Treatment Plant, Winters

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 91-232

WASTE DISCHARGE REQUIREMENTS
FOR
CITY OF WINTERS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. The Board, on 22 September 1989 adopted Order No. 89-174 for the City of Winters which prescribed requirements for a stabilization pond system and spray irrigation disposal facility with a dry weather flow limit of 1.0 millions gallons per day (mgd).

2. The discharger submitted a Sewer System Master Plan dated February 1991 which analyzed the capacity of the existing wastewater treatment and disposal facilities. The average dry weather flow (ADWF) capacity was shown to be 0.7 mgd.

3. Present waste discharge requirements established by Order No. 89-174 are neither adequate nor consistent with plans and policies of the Board.

4. The Discharger discharges approximately 0.6 million gallons per day, average dry weather flow, and has begun the planning process for expansion and/or replacement of the treatment plant. An interim expansion has been proposed which will bring the plant capacity to 0.80 mgd ADWF.

5. The interim expansion has been proposed to repair a pond which has a seepage problem and construct a new 40 acre-foot pond to provide 0.10 mgd additional capacity.

6. The treatment and disposal facilities are in Sections 16 and 17, T8N, R1W, MDB&M, with surface water drainage to Moody Slough, thence Dry Slough, thence Willow Slough, thence Yolo Bypass.

7. The beneficial uses of Moody, Dry, and Willow Sloughs, and Yolo Bypass are industrial supply; agricultural supply; recreation, esthetic enjoyment; ground water recharge; fresh water replenishment, and preservation and enhancement of fish, wildlife and other aquatic resources.

8. The beneficial uses of the ground water are municipal, industrial, and agricultural supply.

9. The Board, on 22 March 1990 adopted a Water Quality Control Plan for the Sacramento River Basin (5A) which contains water quality objectives for all water of the Basin. These requirements are consistent with that Plan.

10. The action to update waste discharge requirements for this facility is exempt from the provisions of the California Environmental Quality Act in accordance with Section 15301, Title 14, California Code of Regulations (CCR).

11. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge.

12. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Order No. 89-174 be rescinded and the City of Winters, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions:

1. The direct discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. The by-pass or overflow of untreated or partially treated waste is prohibited.

3. Discharge of waste classified as `hazardous' or `designated' as defined by Sections 2521 (a) and 2522 (a) of Title 23, CCR, Section 2510, et seq., is prohibited.

B. Discharge Specification:

1. Neither the treatment nor the discharge shall cause a nuisance or condition of pollution as defined by the California Water Code, Section 13050.

2. The discharge shall not cause degradation of any water supply.

3. The discharge shall remain within the designated disposal area at all times.

4. The 30-day average daily dry weather discharge flow (ADWF) shall not exceed 0.7 million gallons per day, until the expansion described in Finding No. 5 is approved as complete by Board Staff, at which time the ADWF may increase to a maximum of 0.80 mgd.

5. Collected screening, sludges, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer.

6. Reclaimed wastewater shall meet the criteria contained in Title 22, Division 4, CCR (Section 60301, et seq.).

7. The dissolved oxygen content in the upper 1 foot of holding ponds shall not be less than 1.0 mg/l for 16 hours in any 24-hour period.

8. The effluent 30-day median total coliform concentration shall not exceed 23 MPN/100ml.

9. A 2.0 foot freeboard shall be maintained in all ponds at all times.

10. There shall be no standing water in the disposal area 24 hours after wastewater is applied.

11. Ponds shall be managed to prevent breeding of mosquitos. In particular,

    a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.

    b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.

    c. Dead algae, vegetation, and debris shall not accumulate on the water surface.

12. Public contact with wastewater shall be precluded through such means as fences, signs, and other acceptable alternatives.

13. For any electrically operated equipment at the site or in the collection system, the failure of which could cause loss of control or containment of waste materials, or violation of this Order, the discharger shall employ safeguards to prevent loss of control over wastes. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means.

14. The discharger shall develop a program to prevent treatment plant upset or by-pass from nondomestic sources by 1 December 1992. The objectives of the program are: (1) to identify nondomestic sources

of discharge, (2) identify constituents which could cause upset or bypass, (3) develop discharge limitations for nondomestic users, (4) develop a nondomestic monitoring program to enforce limitations.

C. **Sludge Disposal:**

1. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner that is consistent with Chapter 15 and approved by the Executive Officer.

2. Any proposed change in sludge use or disposal practice shall be reported to the Executive Officer at least 90 days in advance of the change.

3. The Discharger is encouraged to comply with the State Guidance Manual issued by the Department of Health Services titled *Manual of Good Practice for Landspreading of Sewage Sludge.*

D. **Ground Water Limitations:**

The discharge, in combination with other sources, shall not cause underlying ground water to:

1. Contain waste constituents in concentrations statistically greater than receiving water limits, where specified below, or background water quality where not specified. (For purposes of comparison, background water quality shall be determined when background monitoring provides sufficient data. Quality determined in this manner establishes "water quality protection standard.")

2. Contain chemicals, heavy metals, or trace elements in concentrations that adversely affect beneficial uses or exceed maximum contaminant levels specified in 22 CCR, Division 4, Chapter 15.

3. Exceed a most probable number of total coliform organisms of 2.2/100 ml over any seven-day period.

4. Exceed concentrations of radionuclides specified in 22 CCR, Division 4, Chapter 15.

5. Contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

6. Contain concentrations of chemical constituents in amounts that adversely affect agricultural use.

E. **Provisions:**

1. The Discharger shall comply with the Monitoring and Reporting Program No. 91-232, which is part of this Order, and any revisions there to as ordered by the Executive Officer. The required ground water monitoring program must be implemented within 30 days of the date of this order.

2. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and by reference a part of this order. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."

3. In the event of any change in control or ownership of land or waste discharge facilities described herein, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

4. At least 90 days prior to termination or expiration of any lease, contract, or agreement involving disposal or reclamation areas or off-site reuse of effluent, used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this order.

5. The Discharger shall use the best practicable cost-effective control technique currently available to comply with salinity limits specified in this order.

6. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this order.

7. The Discharger shall comply with the following time schedule to assure compliance with Discharge Specification B.13 of this Order:

Task	Compliance Date
Submit Plan	within 30 days of the date of this order
Full Compliance	within 90 days of the date of this order

8. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

9. If reclaimed water is used for construction purposes, it shall comply with the most current edition of "Guidelines for Use of Reclaimed Water for Construction Purposes". Other uses of reclaimed water not specifically authorized herein shall be subject to the approval of the Executive officer and shall comply with 22 CCR, Division 4.

10. The Board will review this Order periodically and will revise requirements when necessary.

I, WILLIAM H. CROOKS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 22 November 1991.

William H. Crooks

WILLIAM H. CROOKS, Executive Officer

11/26/91

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. 91-232
FOR
CITY OF WINTERS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

Prior to construction, plans and specification for ground water monitoring wells shall be submitted to Board staff for review and approval.

EFFLUENT MONITORING

Effluent samples shall be collected downstream from the last connection through which wastes can be admitted into the outfall. Effluent samples should be representative of the volume and nature of the discharge. Samples collected from the outlet structure of ponds will be considered adequately composited. Time of collection of a grab sample shall be recorded. The following shall constitute the effluent monitoring program when spray irrigation is in use:

Constituents	Units	Type of Sample	Sampling Frequency
Settleable Matter	ml/l	Grab	Weekly
Total Coliform Organisms	MPN/100 ml	Grab	Weekly
Flow	MGD	Cumulative	Daily
Runoff	---	Visual Inspection	Daily
Trihalomethanes	µg/l	Grab	Annually

INFLUENT MONITORING

The following shall constitute the influent monitoring program:

Constituents	Units	Type of Sample	Sampling Frequency
Flow	mgd	Cumulative	Daily

POND MONITORING

Constituents	Units	Type of Sample	Sampling Frequency
Specific Conductance	μmhos/cm	Grab	Weekly
Dissolved Oxygen	mg/l	Grab	Weekly
Freeboard	feet	Visual	Weekly

GROUND WATER MONITORING

The Discharger shall develop a system of ground water monitoring wells to define ground water impacts from the ponds and spray irrigation facilities. One well shall be established upgradient of the facilities to monitor background levels. The number (minimum of 2) and location of wells downgradient of the facilities shall be sufficient to determine ground water impacts. A survey of the well elevations and location must be submitted with the first groundwater monitoring report under this order.

Constituents	Units	Type of Sample	Sampling Frequency
Ground water elevation	feet/inches	Grab	Quarterly
Total Coliform Organisms	MPN/100 ml	Grab	Quarterly
Specific Conductivity	μmhos/cm	Grab	Quarterly
Nitrate as Nitrogen (NO_3)	mg/l	Grab	Quarterly
Trihalomethanes	μg/l	Grab	Annually

REPORTING

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible.

The data shall be summarized in such a manner to illustrate clearly the compliance with waste discharge requirements.

Monthly monitoring reports shall be submitted to the Regional Board by the 15th day of the following month.

The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported to the Board.

Upon written request of the Board, the Discharger shall submit a report to the Board by 30 January of each year. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year. In addition, the Discharger shall discuss the compliance record and the corrective action taken or planned which may be needed to bring the discharge into full compliance with the waste discharge requirements.

The Discharger shall implement the above monitoring program on the effective date of this Order.

Ordered by _____
WILLIAM H. CROOKS, Executive Officer

27 November 1991
(Date)

RPM:mdm

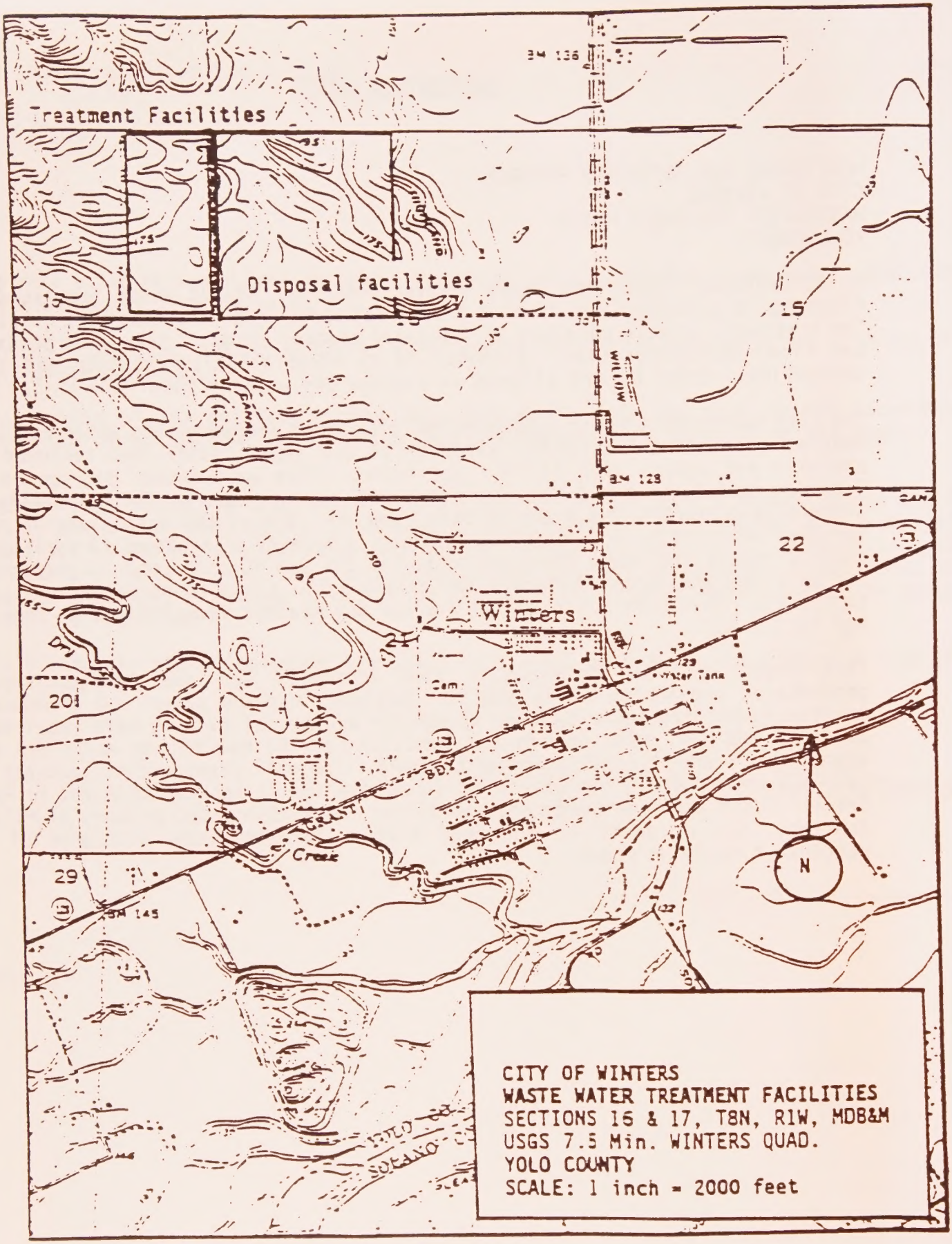
INFORMATION SHEET

MONITORING AND REPORTING PROGRAM
CITY OF WINTERS
WASTEWATER TREATMENT PLANT
YOLO COUNTY

On 22 September 1989, the Board adopted Order No. 89-174 which regulated the discharge of municipal and limited industrial waste water treatment and disposal. The treatment process consists of 4 aerated primary ponds, 2 secondary ponds and one final polishing pond. Disposal is by evaporation/percolation and spray irrigation. Order 89-174 allowed an average dry weather flow rate of 1.0 mgd.

The City submitted a Sewer System Master Plan dated February 1991 which rated the wastewater treatment/disposal capacity at 0.7 mgd. Staff has reviewed the analysis and agrees with the 0.7 mgd rating. The wet weather storage is the limiting factor, this has been confirmed over recent years as the relatively dry winters have brought the plant to peak capacity. One of the stabilization ponds has been required to remain below 50% capacity because of seepage. A preliminary plan to repair the leaky pond and construct one new 40 acre pond is proposed to add 0.10 mgd additional capacity for growth until a new treatment plant can be completed. This order changes the average dry weather flow limitation from 1.0 mgd to 0.7 mgd.

This Order contains enforceable time schedules for the construction of groundwater monitoring wells and for obtaining back-up power. A groundwater monitoring program and a back-up system for electrical failure were required by Order No. 89-174. The design and location for the monitoring wells has been submitted by the City and approved by staff. The well construction contract has been opened for bid. The City's main pump station is located adjacent to Putah Creek. Short term emergency storage exists in an abandonded primary clarifier, however, loss of power at the pump station threatens the discharge of raw wastewater to Putah Creek.


Treatment Facilities
Disposal facilities
Winters
22
15
20
29
N
CITY OF WINTERS
WASTE WATER TREATMENT FACILITIES
SECTIONS 16 & 17, T8N, R1W, MDB&M
USGS 7.5 Min. WINTERS QUAD.
YOLO COUNTY
SCALE: 1 inch = 2000 feet

FUTURE WASTEWATER COLLECTION SYSTEM

EXISTING WASTEWATER COLLECTION SYSTEM